



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/782,354	02/12/2001	Marcel F.C. Schemmann	11890/1	7787
26646	7590	08/24/2005	EXAMINER	
KENYON & KENYON ONE BROADWAY NEW YORK, NY 10004			KIM, DAVID S	
			ART UNIT	PAPER NUMBER
			2633	

DATE MAILED: 08/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/782,354	SCHEMMANN ET AL.	
	Examiner	Art Unit	
	David S. Kim	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 07 March 2005.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 10-15, 21 and 26-30 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-9, 16-18, 22, 31 and 33 is/are rejected.
- 7) Claim(s) 19, 20, 23-25, 32 and 34 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 19 July 2001 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All
 - b) Some *
 - c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2/12/01, 10/15/02</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of **Species 1 (Figs. 1-4b with 7a)** in the reply filed on 07 March 2005 is acknowledged. Applicant indicated that **claims 1-9, 16, 17, 19-25, and 32-34** correspond to Species 1. However, Examiner respectfully considers the following claims to also correspond to Species 1:

Claim 18 – the limitation "wherein data is modulated onto the at least one optical carrier signal in quadrature" corresponds to the quadrature modulation in Fig. 1.

Claim 31 – claim 31 is the parent claim of elected claim 32.

Also, Examiner respectfully considers the following claims to *not* correspond to Species 1:

Claim 21 – the limitation "data is imprinted onto information band centered at the source frequency" corresponds to Species 3-4 (Figs. 5-6). In Species 1 (Fig. 1), there is no data imprinted at the source frequency.

Accordingly, Examiner treats **claims 1-9, 16-20, 22-25, and 31-34** on their merits in this Office Action.

2. **Claims 10-15, 21, and 26-30** are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 07 March 2005.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the following limitations must be shown or the feature(s) canceled from the claim(s):

In claim 3, "at least **one phase shifter** coupled to a data modulator, the at least **one phase shifter modifying** a phase of one of the pair of **data** signals modulating the first optical carrier signal, **and** one of the pair of **data** signals modulating the second optical carrier signal" (emphasis Examiner's, see discussion of this limitation under the section on 35 U.S.C. 112 below).

No new matter should be entered.

Art Unit: 2633

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because:

In Fig. 1, reference character "SG1" has been used to designate **both** an RF signal generator in optical carrier generator 110 and an RF signal generator in optical carrier generator 150. "SG1" is used to label an RF signal generator in optical carrier generator 150 where "SG3" may be intended.

In Fig. 1, reference character "OS4" has been used to designate **both** an optical shifter in optical carrier generator 150 and an optical shifter in data modulator 160.

In Fig. 1, reference character "DS7" has been used to designate **both** a data signal generator in data modulator 165 and a path from splitter S7. The "DS7" label for the path from splitter S7 appears to be unnecessary.

5. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

6. **Claim 33** is objected to because of the following informalities:

In claim 33, under the limitation beginning, "modulating second data," "**a** first polarization state" is used where -- **the** first polarization state -- may be intended (emphasis Examiner's). That is, "a first polarization state" was previously introduced under the limitation beginning, "modulating first data."

Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. **Claims 3-9** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

In particular, notice the following limitation in claim 3 (claims 4-9 all depend on claim 3):

“at least **one phase shifter** coupled to a data modulator, the at least **one phase shifter** **modifying** a phase of one of the pair of **data** signals modulating the first optical carrier signal, **and** one of the pair of **data** signals modulating the second optical carrier signal” (emphasis Examiner’s).

This phase shifter appears to correspond to optical shifter OS2, OS3, OS4, or OS5 in Fig. 1. Notice that each of OS2, OS3, OS4, and OS5 modifies a phase of an **optical carrier** signal. However, the limitation of claims 3-9 above claims a phase shifter that modifies a phase of a **data** signal, which corresponds to the data signal output by data signal generators DS1 or DS2. None of OS2, OS3, OS4, and OS5 modifies the phase of a **data** signal output by DS1 or DS2. Moreover, these optical shifters (OS2, OS3, OS4, or OS5) operate on **optical** signals. The phase shifter of claims 3-9 operates on **data** signals, which are understood to be **electrical** signals in Fig. 1. As **optical** shifters are not generally known to operate on **electrical** signals, one skilled in the art would not be sufficiently enabled to make and/or use the invention of claims 3-9 without undue experimentation. Thus, the specification does not enable one skilled in the art to make and/or use the invention with this contested limitation of claims 3-9.

Additionally, notice that **each** phase shifter in Fig. 1 (e.g., OS2, OS3, OS4, OS5) that corresponds to the phase shifter of claim 3 **only** modifies the phase of **one** signal. However, the limitation of claims 3-9 above claims a phase shifter that modifies the phase of **more than one** signal (“a phase of one of the pair of data signals modulating the first optical carrier signal, **and** one of the pair of data signals modulating the second optical carrier signal”). None of the phase shifters in Fig. 1 that corresponds to the

Art Unit: 2633

phase shifter of claims 3-9 modifies the phase of **more than one** signal. As Applicant provides no further disclosure about how **one** of the phase shifters of Fig. 1 modifies **more than one** data signal, one skilled in the art would not be sufficiently enabled to make and/or use the invention of claims 3-9 without undue experimentation. Thus, the specification does not enable one skilled in the art to make and/or use the invention with this contested limitation of claims 3-9.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. **Claims 8-9** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In particular, notice the following limitation in claim 8 (claim 9 depends on claim 8):

“at least one optical combiner coupled to a **source signal** generator and at least one data modulator, the at least one optical combiner combining an optical data signal with a **source frequency**”
(emphasis Examiner’s).

This combiner appears to correspond to combiner CMB4, CMB5, CMB9, or CMB10. Combiners generally combine **signals with other signals**. The combiner of the limitation above combines an optical data **signal** with a **source frequency**. A “frequency” is not a signal. It appears that “source signal with a source frequency” may be intended instead of simply “a source frequency.”

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Hodgkinson et al.

12. **Claims 1-2, 16-17, and 31** are rejected under 35 U.S.C. 102(b) as being anticipated by Hodgkinson et al. (U.S. Patent No. 5,107,358, hereinafter “Hodgkinson”).

Regarding claim 1, Hodgkinson discloses:

An optical data signal transmitter comprising:

at least one optical carrier generator (optical source 16 in Fig. 4b), each generating an optical carrier signal having two side frequencies (f_1 and f_2) derived from a source frequency (f_1);

at least one data modulator (modulator 52 after location B in Fig. 9) for modulating data onto the at least one optical carrier signal, creating at least one optical data signal including modulated data and having a first polarization state; and

at least one polarization transformer (birefringent device 51 in Fig. 9) for encoding a portion of the modulated data and a first of the two side frequencies of the at least one optical data signal with a second polarization state, the second polarization state being orthogonal (col. 5, l. 19-22) to the first polarization state.

Regarding claim 2, Hodgkinson discloses:

The optical data signal transmitter of claim 1, wherein the at least one data modulator (e.g., modulator 52 after location B in Fig. 9) modulates data onto information bands (modulating the carrier with frequency f_1 results in one DSB-SC information band, modulating the carrier with frequency f_2 results in another DSB-SC information band), each information band centered at one of the two side frequencies (one band is centered at f_1 , another band is centered at f_2) of the at least one optical carrier signal respectively.

Regarding claims 16-17, claims 16 and 17 are method claims that introduce limitations that correspond to the limitations introduced by apparatus claims 1 and 2, respectively. Therefore, the recited means in apparatus claims 1-2 read on the corresponding steps in method claims 16-17.

Art Unit: 2633

Regarding claim 31, claim 31 is a system claim that corresponds largely to the apparatus claim

1. Therefore, the recited means in apparatus claim 1 read on the corresponding means in system claim 31.

Claim 31 also includes limitations absent from claim 1. Hodgkinson also discloses these limitations:

an optical fiber (abstract) for carrying the optical data signal; and

an optical receiver (Fig. 6 or 7) for receiving the optical data signal.

Yee et al.

13. **Claim 33** is rejected under 35 U.S.C. 102(e) as being anticipated by Yee et al. (U.S. Patent

Applicant Publication No. US 2002/0097469 A1, hereinafter “Yee”).

Regarding claim 33, Yee discloses:

A method for enhancing data capacity in optical data communication, comprising the steps of:

modulating first data (data of optical transmitter 1610A in Fig. 16) onto a first optical carrier (e.g., 1669A) onto a data band (e.g., 1666A(U)) occupying a data frequency range (e.g., range occupied by 1666A(U) and 1666B(L)), the first optical carrier including a first side frequency (e.g., frequency of 1669A or 1664A(U)) separated from the frequency range of the data band, resulting in a first modulated carrier having a first polarization state;

modulating second data (data of optical transmitter 1610B) onto a second optical carrier (e.g., 1669B) onto a data band (e.g., 1666B(L)) occupying the data frequency range, the second optical carrier including a second side frequency (e.g., frequency of 1669B or 1664B(L)) separated from the data frequency range of the data band in a direction opposite (e.g., the frequencies of 1669A and 1664A(U) and the frequencies of 1669B and 1664B(L) are opposite sides of the data frequency range) from the first side frequency, resulting in a second modulated carrier having a first polarization state (not shown, but a polarization controller 1715 can generally handle a variety of input polarizations, including the first polarization state);

changing the polarization state of the second modulated carrier to a second polarization state orthogonal to the first polarization state (paragraph [0124]);

Art Unit: 2633

combining (optical combiner 1614) the first modulated carrier with the second modulated carrier into a combined carrier;

optically transmitting the combined carrier (transmission across fiber 120);
receiving the transmitted carrier (receiver subsystem 1604); and
extracting the first data (e.g., receiver 1630B) having the first polarization state from the second data (e.g., receiver 1630C) having the second polarization state.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Hodgkinson et al.

16. **Claim 18** is rejected under 35 U.S.C. 103(a) as being unpatentable over Hodgkinson.

Regarding claim 18, Hodgkinson does not expressly disclose:

The method of claim 17, wherein data is modulated onto the at least one optical carrier signal in quadrature.

However, modulating data onto an optical carrier signal in quadrature is extremely well known in the art. Examples include QAM, QPSK, DQPSK. At the time the invention was made, it would have been

Art Unit: 2633

obvious to one of ordinary skill in the art to employ quadrature modulation in the method of Hodgkinson. One of ordinary skill in the art would have been motivated to do this since modulating in quadrature is conventionally employed to increase transmission data rates.

Yee et al.

17. **Claim 22** is rejected under 35 U.S.C. 103(a) as being unpatentable over Yee.

Regarding claim 22, Yee discloses:

An optical receiver, comprising:

an optical splitter (splitter 2533 in Fig. 21) for splitting an incoming optical data signal into a first optical data sub-signal and a second optical data sub-signal,

the incoming optical data signal (composite optical signal 1690 in Fig. 16) including a first side carrier frequency (1664A(U) in Fig. 16, 2564A in Fig. 21) having a first polarization state, a second side carrier frequency (1664B(L) in Fig. 16, 2564B in Fig. 21) having a second polarization state, and a central information band (band between 1664A(U) and 1664B(L) in Fig. 16, band between 2564A and 2564B in Fig. 21), the central information band including first data (1666A(U) in Fig. 16, 2566A in Fig. 21) having the first polarization state and second data (1666B(L) in Fig. 16, 2566B in Fig. 21) having the second polarization state; and

a frequency differentiator (filters 2534A-B in Fig. 21), the differentiator acting on the first and second side carrier frequencies differently, enabling the first side carrier frequency and the first data to be separated from the second side carrier frequency and the second data.

Yee does not expressly disclose:

each of the sub-signals including the first side carrier frequency (1664A(U) in Fig. 16, 2564A in Fig. 21) having the first polarization state, the second side carrier frequency (1664B(L) in Fig. 16, 2564B in Fig. 21) having the second polarization state, and the central information band (band between

Art Unit: 2633

1664A(U) and 1664B(L) in Fig. 16, band between 2564A and 2564B in Fig. 21), the central information band including first data (1666A(U) in Fig. 16, 2566A in Fig. 21) having the first polarization state and second data (1666B(L) in Fig. 16, 2566B in Fig. 21) having the second polarization state.

Rather, Yee is silent on the exact spectral contents of each of the sub-signals output by the optical splitter 2533 in Fig. 21. The exact spectral contents of each of the sub-signals depend on the type of optical splitter employed.

On one hand, at the time the invention was made, one could consider optical splitter 2533 to be a normal passive optical splitter. Such is the default understanding when a drawing is labeled, "splitter," as in Fig. 21. In this case, each of the sub-signals would have the same spectral contents as the input signal to the splitter, thus reading on the "each of the sub-signals including..." limitation of claim 22 above.

On the other hand, in view of the polarizing beam splitter module 1633 in Fig. 16, similarly labeled, "splitter," one could consider optical splitter 2533 to be a polarizing beam splitter module. In this case, each of the sub-signals would not have the same spectral contents as the input signal to the polarizing beam splitter.

In either case, at the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ a normal passive optical splitter as splitter 2533 in Fig. 21. One of ordinary skill in the art would have been motivated to do this since a normal passive optical splitter is generally known to be cheaper and simpler than other types of optical splitters. Even in the case that splitter 2533 is a polarizing beam splitter, replacing it with a normal passive optical splitter would not substantially change the fundamental function of optical splitter 2532 in Fig. 21, to separate optical signals 2592A and 2592B from each other.

Allowable Subject Matter

18. **Claims 19-20, 23-25, 32, and 34** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Logan, Jr. '309 and Logan, Jr. '651 are cited to show some transmitters that each comprise an optical carrier generator that generates an optical carrier signal having two side frequencies derived from a source frequency and that also each comprise a data modulator for modulating data onto the optical carrier signal. O'Reilly et al. from Electronics Letters and O'Reilly et al. from IEE Proceedings-J are cited to show some transmitters that each comprise an optical carrier generator that generates an optical carrier signal having two side frequencies derived from a source frequency, that also each comprise a data modulator for modulating data onto the optical carrier signal, and that also each comprise a mach-Zehnder interferometer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Kim whose telephone number is 571-272-3033. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571-272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DSK


JASON CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600